

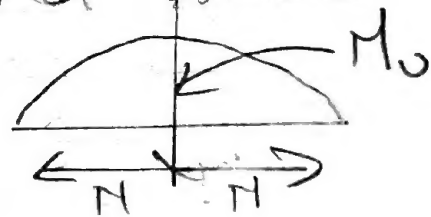
W16x26  
 $f_c = 4000$  psi

10'-0" O.C. BEAM SPACING  
 30'-0" SPAN

$b_{eff} \leq \text{SPACING} = 10'-0"$   
 $L/4 = 30'-0"/4 = \underline{7.5'}$  GOVERNS.  
 SLAB EDGE

CHECK SHEAR STRENGTH:

1 STUD/FT  $\times$  30 FT = 30 TOTAL STUDS  
BUT, USE ONLY HALF SINCE



15 STUDS

$$Q_n = 17.2^k \quad \Sigma Q_n = 15 \times 17.2 = 258^k$$

$$a = \frac{\Sigma Q_n}{0.85 f_c b_{eff}} = \frac{258}{0.85(4)(10)} = 0.94"$$

ENTER TABLE 319

$$Y_2 = 6.25 - 0.94/a = 5.75$$

$$Z_{Gn} = \underline{\underline{258}}$$

INTERPOLATE VALUES -

$$\left( \frac{345 - 324}{289 - 242} \right) (258 - 242) + 324$$

$$\Rightarrow \underline{331}$$

$$\left( \frac{356 - 333}{289 - 242} \right) (258 - 242) + 333 = \underline{340}$$

5.75 LAYS IN BETWEEN

$$A_{1n} = \frac{340 + 331}{2} = \boxed{335 \text{ K-FT}}$$

OR USE METHOD FROM EX 2.

$$Y_{ENA} = \frac{A_s d_3 + (\sum Q_n / F_y) (2d_3 + d_1)}{A_s + (\sum Q_n / F_y)}$$

$$= \frac{7.68 \left( \frac{15.9}{2} \right) + \left( \frac{258}{50} \right) (15.9 + 62.5 - 0.94/2)}{7.68 + (258/50)}$$

$$= 172 / 12.84 = 13.4"$$

$$I_{LB} = I_s + A_s (Y_{ENA} - d_3)^2 + (\sum Q_n / F_y) (2d_3 + d_1 - Y_{ENA})^2$$

$$I_{LB} = 301 + 7.68 (13.4 - 15.9/2)^2 + \left( \frac{258}{50} \right) (15.9 + 62.5 - 0.94/2 - 13.4)^2$$

$$301 + 228 + 354 = \underline{\underline{883 \text{ in}^4}}$$

CHECK DEFL

$$SELF = 60 \text{ PSF} + 8 \text{ PSF} = 68 \text{ PSF}$$

$$POST COMP = 15 \text{ PSF}$$

$$LL = 40 \text{ PSF NR.}$$

$$\Delta_{\text{INITIAL}} = \frac{5wL^4}{384EI_{\text{STEEL}}}$$

$$= \frac{5(68 \times 10')(30)^4 \times 12^3}{384E \times 301} = 1.42'$$

CAMBER 80% = 1.13"  $\Rightarrow$  Round Down  
to 1"

POST COMPOSITE DEFLECTION:

$$\Delta_{\text{POST}} = \frac{5(15+40)(10')(30)^4 \times 12^3}{384E(I_{\text{COMP}} = 883 \text{ in}^4)} = 0.39'$$

TOTAL DEFL:

$$1.42'' - 1'' + 0.39'' = 0.81''$$

$$L/240 = 360''/240 = 1.5'' \Rightarrow \text{BEAM OK}$$

$$\Delta_{\text{LL}} = 0.39 \times \frac{40}{(15+40)} = 0.28''$$

$$L/360 = 360''/360 = 1'' \Rightarrow \text{BEAM OK}$$